



Original scientific paper

# Ethno-sustainability of an Indigenous Architecture in the Northern Philippines Using Grounded Theory

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## ABSTRACT



*This study investigates the ethno-sustainability of Itawit architecture as a distinctive indigenous practice in the Cagayan province of Northern Philippines. Employing a qualitative grounded theory approach, data were gathered through ethnographic interviews, field observations, and archival research with building owners, carpenters, shamans, and elders from Middle and Southern Cagayan. Using coding, memoing, and thematic analysis, the research thematised vernacular construction practices and knowledge systems, framing them as integral components of cultural heritage and community resilience. Findings demonstrate that Itawit architecture embodies sustainable principles through locally sourced materials, ritual practices, and collective labour systems such as ivvet (community construction). Despite modernisation pressures and the adoption of permanent materials, traditional ecological knowledge and oral transmission continue to sustain building practices and cultural identity. The study highlights “ethno-sustainability” as a framework wherein spiritual beliefs, environmental sensitivity, and social contracts interconnect to preserve community resilience. Documentation of terms, visual records, and rituals provides a baseline reference for conservationists, policymakers, and urban planners. Integrating these indigenous practices into contemporary planning contributes to culturally inclusive and environmentally sustainable development in the Philippines and beyond.*

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## Highlights:

- Modernisation pressures reduce continuity of Itawit architectural traditions.
- Oral transmission and apprenticeship sustain vernacular construction knowledge.
- Locally sourced materials enhance environmental sustainability of Itawit architecture.
- Community labour systems strengthen social cohesion and resilience.
- Ethno-sustainability provides a framework for integrating indigenous heritage into urban planning.

## Contribution to the field statement:

This study contributes to the field by documenting *Itawit architecture* as an expression of ethno-sustainability, bridging indigenous knowledge with sustainable urban development. Using grounded theory, it introduces a methodological framework that positions vernacular traditions within contemporary urbanisation debates, highlighting their socio-economic, cultural, and ecological relevance in shaping resilient urban futures.

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## 1. Introduction

### 1.1 Indigenous Architecture in the Philippines

In an era where rapid urbanization and globalization have transformed our cities, the preservation and inclusion of indigenous architecture remain crucial in maintaining cultural diversity and social resilience in modern and contemporary urban environments. Around the world, urbanization has changed landscapes, frequently at the expense of local economies and indigenous cultural practices. Despite this, there is a dearth of empirical studies investigating how vernacular architecture can promote socioeconomic resilience in urbanizing environments (Benslimane & Biara, 2019; Matar, Palaiologou, & Richards, 2023). The studies show potential for how to look at indigenous communities within or immediately along the bounds of urban zones, particularly on potential socio-economic impacts. While there are limited studies on vernacular or indigenous architectural heritage and its sustainability features (Fischl & Teodoro, 2016), the Philippines can learn from these studies to try to bridge the gap on the potential of the former towards more sustainable local landscapes.

The Philippines is a country with many ethnic groups, commonly distinguished by each group's language. All the ethnic groups in the Philippines have their unique architecture, but few have been published, and some are still in manuscript form. The early stages of this documentation in their architecture were in the 1980s and 1990s (Dacanay et al., 1992; Perez et al., 1989). But still, few have been explored when it comes to the vernacular architecture of the Philippines, so much to its (for example) relationship with urbanism and sustainability. This poses a challenge to the study of sustainable architecture in the realm of vernacular or indigenous expressions, versus the wide range of Spanish and American Colonial period architecture published in the past 30 years. Recent studies show potential in trying to understand the role of vernacular architecture and sustainability within or outside urban zones (Benslimane & Biara, 2019; Mazraeh & Pazhouhanfar, 2018), for example, the studies on climate response, environmental integration, efficiency in resource use, and social cohesion (Matar, Palaiologou, & Richards, 2023), and amid pressure from climate change, local wisdom in vernacular architecture could contribute to understanding sustainable living and enhancing community resilience (Prabaswara, Hariyanto, & Arifin, 2021; Qian & Xu, 2025).

This study includes a broader discourse on the potentials of indigenous architecture inside and outside urban settings, and the potential of “ethno-sustainability” in the socio-economic sphere in the Northern Philippines; it will also highlight a larger conversation on urban affairs. The study will offer important insights into how indigenous knowledge systems can be used to promote sustainable urbanization by demonstrating how traditional architectural forms act as both cultural symbols and drivers of local economic development (Dessein, Soini, Fairclough, & Horlings, 2015; Matar, Palaiologou, & Richards, 2023). By showing that indigenous architecture can be in line with contemporary urban planning objectives to support socio-cultural continuity and economic opportunities, this study also closes the gap between cultural preservation and socio-economic inclusion. It increases knowledge of how, within the process of urban transformation, ethno-sustainability can promote socioeconomic well-being, local identity, and resilient community development. This study provides a relevant model for incorporating indigenous architectural practices into modern urban strategies, enhancing the field of urban affairs with culturally sensitive, financially feasible, and environmentally sustainable solutions as cities around the world struggle to strike a balance between modernization and heritage conservation (Leza, 2020; Matar, Palaiologou, & Richards, 2023).

### 1.2 Background and Context

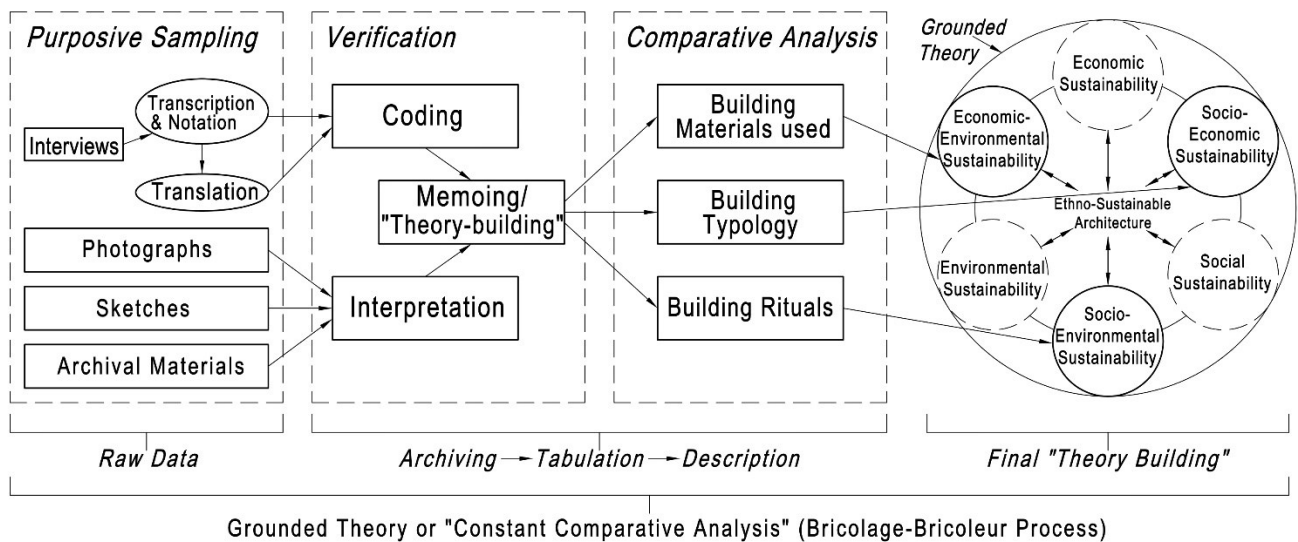
In the Philippines' vernacular architecture, many have documented (published and some unpublished) local architectural traditions mainly through ethnography, and have been fairly collected, albeit there are still some not yet been fully documented (See Table 1). In particular, one of these architectural traditions can be found in the Northern Philippines, specifically in the Cagayan province, known as the Itawit. The architectural heritage of the Itawit community in the Philippines is still poorly documented, which hinders attempts at culturally sensitive and sustainable development. By

investigating how Itawit architectural traditions support community vitality and economic sustainability in the face of urban growth, this study aims to close this gap. Indigenous structures are rarely seen in the Cagayan Valley Region in the Northern Philippines. Some have been damaged by strong typhoons (such as Typhoon Lawin in 2016). This makes the owners of these buildings choose more permanent structural materials such as steel and concrete. The existing practices in indigenous knowledge are slowly vanishing along with the construction materials and methods, which is apparent especially in the shift from inferior to more permanent structures (Hoffman, 2009).

**Table 1:** Existing Literatures in Philippine Indigenous Architecture.

| Ethnic group                                             | Location                                                      | Architectural style                                                                                                                                                                                                                                 | Notes                                                                                                                                                                                                                                                    | Reference                |
|----------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Ifugao, Bontoc, Benguet, Apayao, Kalinga                 | Cordillera                                                    | Elevated cube house (varies depending on geography)                                                                                                                                                                                                 | Northern Strain (Ifugao, Bontoc, Benguet) and Southern Strain (Apayao, N. Kalinga)                                                                                                                                                                       | (Scott, 1962)            |
| Baluga                                                   | Zambales-Pampanga                                             | Lean-to (for nomadic), elevated cube house with a low roof (cogon)                                                                                                                                                                                  | The first section presents the group as “living with nature” by narrating how they build their houses using indigenous materials. The last section is heavily focused on the documentation of Tagalog houses, including architectural plans and details. | (Dacanay et al., 1992)   |
| Bontoc & Ifugao                                          | Cordillera                                                    | Elevated cube house with a steep roof (cogon)                                                                                                                                                                                                       |                                                                                                                                                                                                                                                          |                          |
| Mangyan                                                  | N. Oriental Mindoro                                           | Communal longhouse, elevated cube house with low roof, and lean-to                                                                                                                                                                                  |                                                                                                                                                                                                                                                          |                          |
| Badjao                                                   | Mindanao                                                      | Boat house                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                          |                          |
| Tagalog                                                  | Bulacan, Rizal, Cavite, Batangas, Quezon, Nueva Ecija, Tarlac | Elevated cube house, a.k.a. “Nipa house”                                                                                                                                                                                                            | Includes animist traditions (rituals & legends) with architecture, local art, and architectural and pictorial documentation of their traditional houses. It also highlights the usage of indigenous materials in their houses.                           | (Perez et al., 1989)     |
| Isneg, Kalinga, Bontoc, Ifugao, Kankanai                 | Cordillera                                                    | Elevated cube house with a steep roof (varies based on culture)                                                                                                                                                                                     |                                                                                                                                                                                                                                                          |                          |
| Ivatan                                                   | Batanes Islands                                               | Elevated cube house with a steep roof                                                                                                                                                                                                               |                                                                                                                                                                                                                                                          |                          |
| Mangyan                                                  | N. Oriental Mindoro                                           | Elevated cube house with a steep roof                                                                                                                                                                                                               |                                                                                                                                                                                                                                                          |                          |
| Panay                                                    | Panay Island                                                  | Elevated cube house with a low roof, mainly used bamboo for exterior and interior decorations                                                                                                                                                       |                                                                                                                                                                                                                                                          |                          |
| Badjao, Samal, Subanun, Mandaya, Yakan, Tausug, Maranao  | Mindanao & Sulu                                               | Elevated longhouses, clustered planning (varies based on culture)                                                                                                                                                                                   |                                                                                                                                                                                                                                                          |                          |
| Ivatan                                                   | Batanes Islands                                               | Ethnic and folk architecture (varies per island). See also Ignacio & Alejandrino (2005)                                                                                                                                                             |                                                                                                                                                                                                                                                          |                          |
| Apayao, Bontoc, Ifugao, Kalinga, Kakanay, Ibaloy, Sagada | Cordillera                                                    | Varies (typically, an elevated cube house with a steep roof)                                                                                                                                                                                        |                                                                                                                                                                                                                                                          |                          |
| Tagalog                                                  | Central Luzon                                                 | Elevated cube house with a steep roof                                                                                                                                                                                                               | The book treated it in the “Visual Dictionary” style of Ching (2012) in presenting the anatomy of the house of each ethnic group. It includes their locations, a short description of the architectural style, and the building materials used.          | (Fernandez, 2015)        |
| Badjao, Tausug, Yakan                                    | Mindanao                                                      | Elevated rectangular cube house with steep roof                                                                                                                                                                                                     |                                                                                                                                                                                                                                                          |                          |
| Mangyan                                                  | Mindoro                                                       | Single-family dwelling & communal house (no interior divisions). Steep roof, no windows (but opening strip bet. wall and roof)                                                                                                                      |                                                                                                                                                                                                                                                          |                          |
| Bugkalot (Ilongot), Tinguian, & Gaddang                  | N. Luzon                                                      | Houses built on trees                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                          |                          |
| Mandaya, Manobo, Tiruray, & Bukidnon                     | Mindanao                                                      | Houses built on trees                                                                                                                                                                                                                               | The writing style and approach are descriptive and encyclopedic, which means that the information is merely used to identify the indigenous architectural style of the Philippine archipelago. No house anatomy is available.                            | (Tiongson, et al., 2017) |
| Ifugao, Mayoyao, Bontok, Sagada, Kalinga, Kankanaey      | Cordillera                                                    | Description and analysis reveal that Cordillera houses are of the Ifugao prototype                                                                                                                                                                  |                                                                                                                                                                                                                                                          |                          |
| Tboli                                                    | S. Cotabato, Mindanao                                         | Houses on hilltops & rolling land. Large one-room house with centralized space surrounded by functional space                                                                                                                                       |                                                                                                                                                                                                                                                          |                          |
| Tausug                                                   | Sulu, Mindanao                                                | Houses are far from the seashore. Houses with 9 posts, each signifying parts of the human body                                                                                                                                                      |                                                                                                                                                                                                                                                          |                          |
| Sama & Sama Dilaut (Badjao)                              | Sulu, Mindanao                                                | Houseboats (lepa, jenging, & dapang) for constant travels.                                                                                                                                                                                          |                                                                                                                                                                                                                                                          |                          |
| Filipino Muslims                                         | Mindanao                                                      | Houses with oversized posts resting on large stones against earthquakes. Includes terms kuta (fort), ranggar (Maranao term for small masjid), langar (Tausug & Yakan term for small masjid), and torogan (large & prominent houses for chieftains). |                                                                                                                                                                                                                                                          |                          |

Initially, this study has few base studies in the culture; it has to use Grounded Theory in trying to thematize as well as document the architecture of the indigenous group. With that, it is the most detailed when it comes to the data gathered so far, as to terminology, rituals, and photos, directly related to the Itawit architecture, and would help identify, preserve/revive (compare Eames, 2019), and encourage these sustainable practices integrated into policies (Acabado & Martin, 2018; Dessein, Soini, Fairclough, & Horlings, 2015; Rapoport, 2005).



**Figure 1.** Structure of the study.

This study's goal is practically modest: to (1) define Itawit architecture and identify samples of it in the province, (2) present their sustainable practices using the construct "ethno-sustainable architecture", and (3) propose and recommend actions for the preservation of these indigenous practices.

The gradual loss of their architectural practice can be due to the age or worse, death of carpenters, elders, and shamans, resulting in the less frequent transfer of the knowledge to the younger generations. Nonetheless, the building tradition of bamboo, cogon, and wood is not yet extinct since the financially challenged Itawit of Cagayan is continuing the tradition. By offering a thorough ethnographic and architectural description of the Itawit community in the Northern Philippines, this study adds to the body of knowledge by emphasizing how socioeconomic resilience in the face of urban change can be supported by cultural preservation. It provides a fresh approach to incorporating indigenous practices into sustainable urban development policies through its creative application of grounded theory.

## 2. Materials and Methods

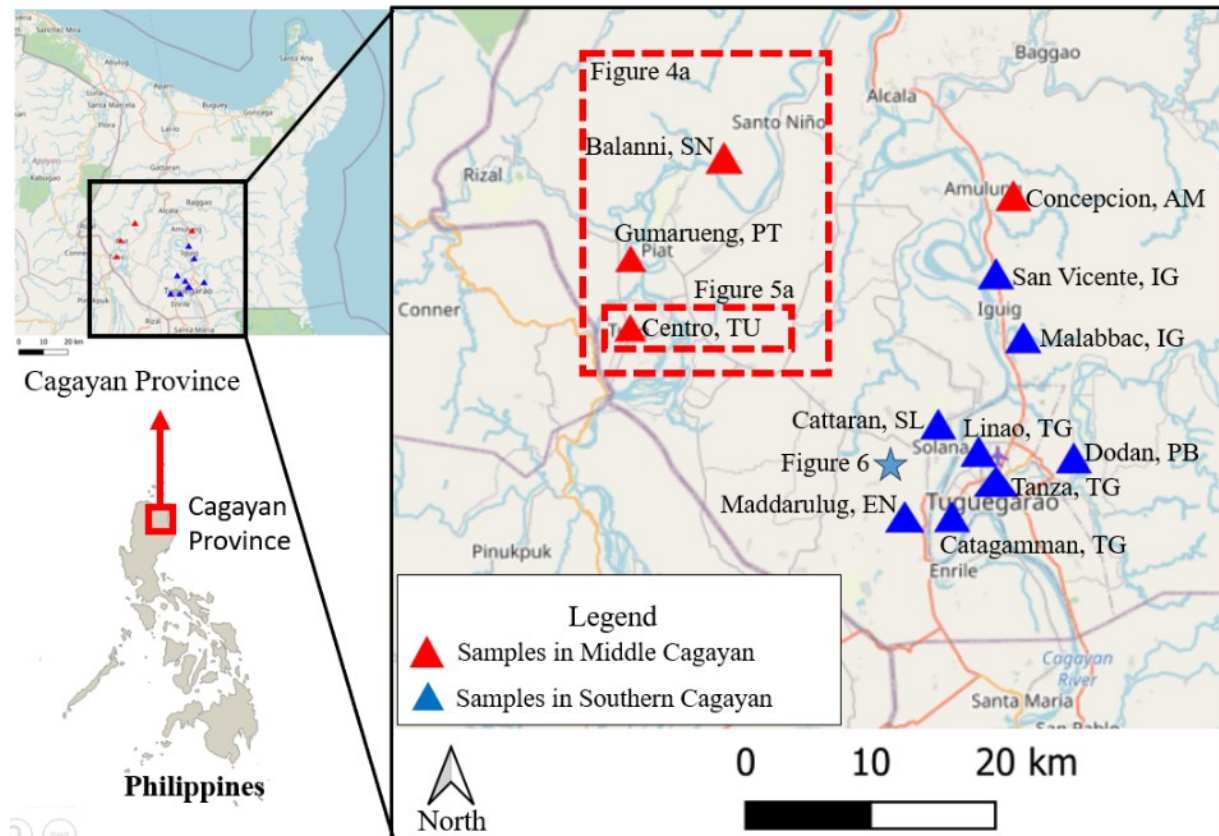
### 2.1 Study Design and Setting

The study methodically investigated and interpreted indigenous architectural practices using a qualitative grounded theory approach. Photographs, archival document analysis, and ethnographic interviews were all used in the data collection process. The identification of important themes was made easier by coding and memoing techniques, which were subsequently subjected to inductive analysis to create an ethno-sustainability model. A conceptual flowchart demonstrates this methodical approach (See Figure 1), which guarantees transparency and reproducibility. The main variables to be investigated are (1) building rituals, (2) houses/structures, and (3) building materials. Each was documented and described based on the bearers and practitioners of these building rituals, architectural knowledge, and how the construction materials are gathered.



## 2.2 Participants or Subjects

The study employed Grounded Theory to collect data from different Itawit communities in the Middle Cagayan (MC) and Southern Cagayan (SC) regions (Groat & Wang, 2013; Aksamija, 2021; Ignatow & Mihalcea, 2018). MC includes the towns of Piat (PT), Tuao (TU), Sto. Niño (SN) and Amulung (AM) – specifically along the Chico River and Pangul Valley; whereas the SC geographical group includes the towns of Iguig (IG), Tuguegarao City (TG), Solana (SL), Enrile (EN), and Peñablanca (PB) – upstream of the Cagayan River. Phase 1 included purposive sampling in locating and preselecting the sites in the mentioned areas (MC and SC). Samples were compared on the variation of architectural styles based on their livelihood from the MC and SC.



**Figure 2.** Location of research area in the Northeastern part of Luzon Island, Philippines.

## 2.3 Materials and Equipment

Phase 2 is the fieldwork proper, where three data gathering collection methods are used: (1) interviews for main correspondents, i.e., building owners, elders, carpenters, and shamans; (2) on-site and archival photographs for the rituals, structures, and materials; and (3) architectural sketches for the plans, elevations, and others. The journals, digital images, notes, and other gathered data were archived digitally.

## 2.4 Procedures and Protocols

Free prior informed consent was secured from respondents and elicitation forms (bilingual in English-Itawit, basing on the University of the Philippines elicitation forms for linguistics) are used to collect the ethno-sustainable knowledge based on what they currently practice and what they remember. After these, communications via calls and messages were made to verify and clarify what the respondents meant with the taken interviews.

## 2.5 Data Analysis

Phase 3 collected ethno-sustainable knowledge and extant samples (initially) elicited from the respondents and grouped them based on the geographic location of the towns in MC and SC. Phase 4 of this study is to compare the ethno-sustainable architecture of the samples being shown, and is based on their geographical areas. Gathered data were memoed, technically described, compared and analyzed, and finally thematized using inductive logic (Groat & Wang, 2013; Aksamija, 2021). Finally, the data gathered were compared based on the geographic areas to build the construct of “Ethno-sustainability.”

## 3. Results

### 3.1 Presentation of Key Findings

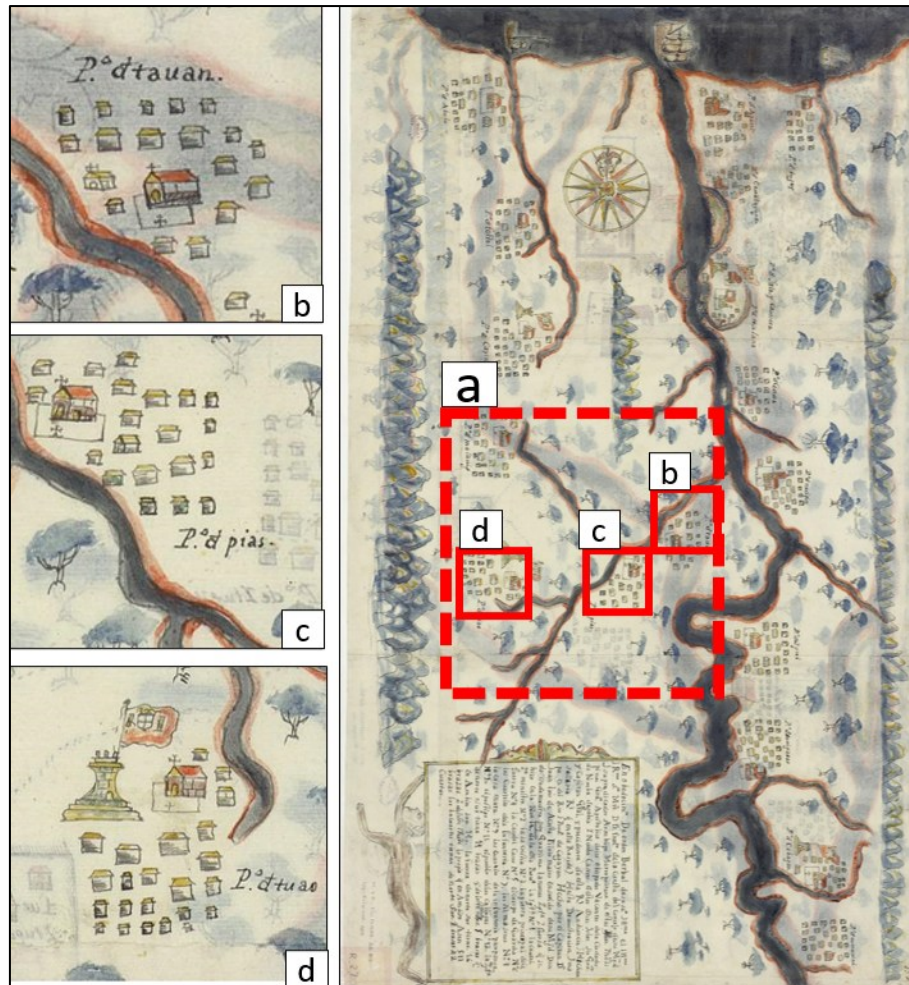
Using the Grounded Theory method, this is divided into two sections: (1) defining Itawit architecture and (2) its ethno-sustainable architecture. First, it will show the samples taken from the fieldwork and interviews, as well as historical and archival documents, drawings, illustrations, and photographs in presenting the unique style of Itawit architecture in the Northern Philippines - this will be its first architectural report, since most literatures in Philippine architecture presents Batanes and Cordilleran styles in the Northern Philippines (Perez, Encarnacion, Dacanay, Fortin, & Chua, 1989; Fernandez, 2015). Second, with “ethno-sustainable architecture” as a model in the onvestigation, it attempts to the interconnect pillars of “sustainability” in architectural terms: (1) Part 1: Ethno-Sustainable Architecture and Spirituality with the subtopics “Animism” and “Ecological Mediums”; (2) Part 2: Ethno-Sustainable Architecture and Environmental Sensitivity with subtopics “Ritualistic Usage of Plants”, “Ethnobotany”, and “Craftsmanship and lifeways”; and (3) Part 3: Ethno-Sustainable Architecture and the Social Contracts with subtopics “Intracultural and Intercultural Relationships.” The subtopics are the storylines borrowed from Soini and Birkeland (2014).

#### 3.1.1 Defining Itawit Architecture

This definition of Itawit architecture in Northern Luzon is based on and divided into (1) historical data and (2) fieldwork data.

##### 3.1.1.1 Historical data on Itawit architecture

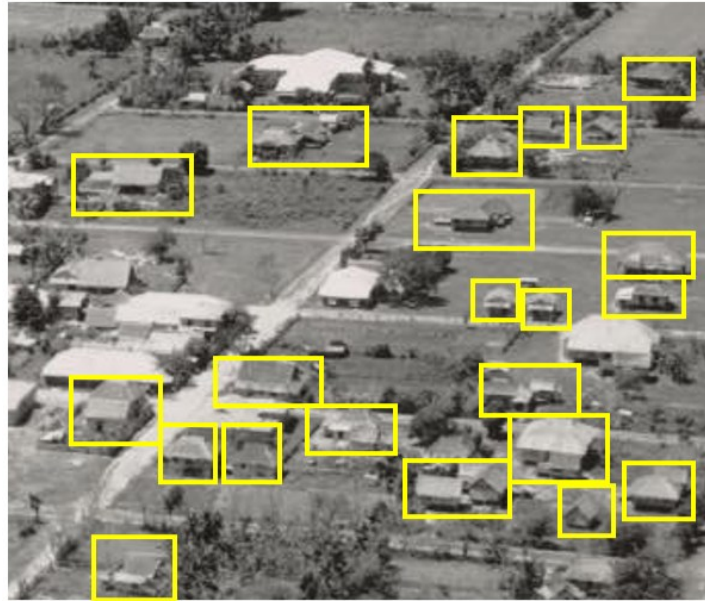
Spanish colonial documents reported late 16th to early 20th century records about Itawit buildings, settlements, and migration. Though very limited in the indigenous architecture strictly by itself, historical and archival documents indicate that Itawit settlements were initially identified mainly along the Chico River from the town of Santo Niño (former pueblo of Tabang) and upstream towards Piat and Tuao (Malumbres, 1918; Keesing, 1962; Blair & Robertson, 1903). Perhaps, one of the oldest maps and depictions of houses of the Itawit is the one drawn in 1719 by the Spaniard Juan Luis Acosta, written shortly after a large-scale rebellion of locals in the province in 1718 (Acosta, 1719). A similar language, Ibanag has a Spanish-period dictionary (Bugarin & Lobato de Santo Tomas, 1854) that can be compared with Itawit as a reference in the definition building parts, for instance, datag (floor) and tarawag (rafter).



**Figure 3.** Spanish colonial period map of the known Itawit settlement according to Acosta (1719).

Much later, reconnaissance photos of the United States military (National Archives and Records Administration, 1935) provide one of the best aerial photographs of an Itawit community in Tuao (MC). Figure 5 shows a cropped portion of the photo and boxes in yellow what looks like indigenous houses because of their darker roofs—signs of cogon. In the 1970s, one of the earliest photographs of a known Itawit house is along Solana (SC), which shows a “bridged house” – one for dwelling and the other for the kitchen. And in Rocero’s (1981) study of the Itawit ethnobotany, it listed the local species of wood, grass, and plants used in Itawit houses.





**Figure 4.** Cropped portion of reconnaissance aerial photo, 1935. Source: National Archives and Records Administration, USA.



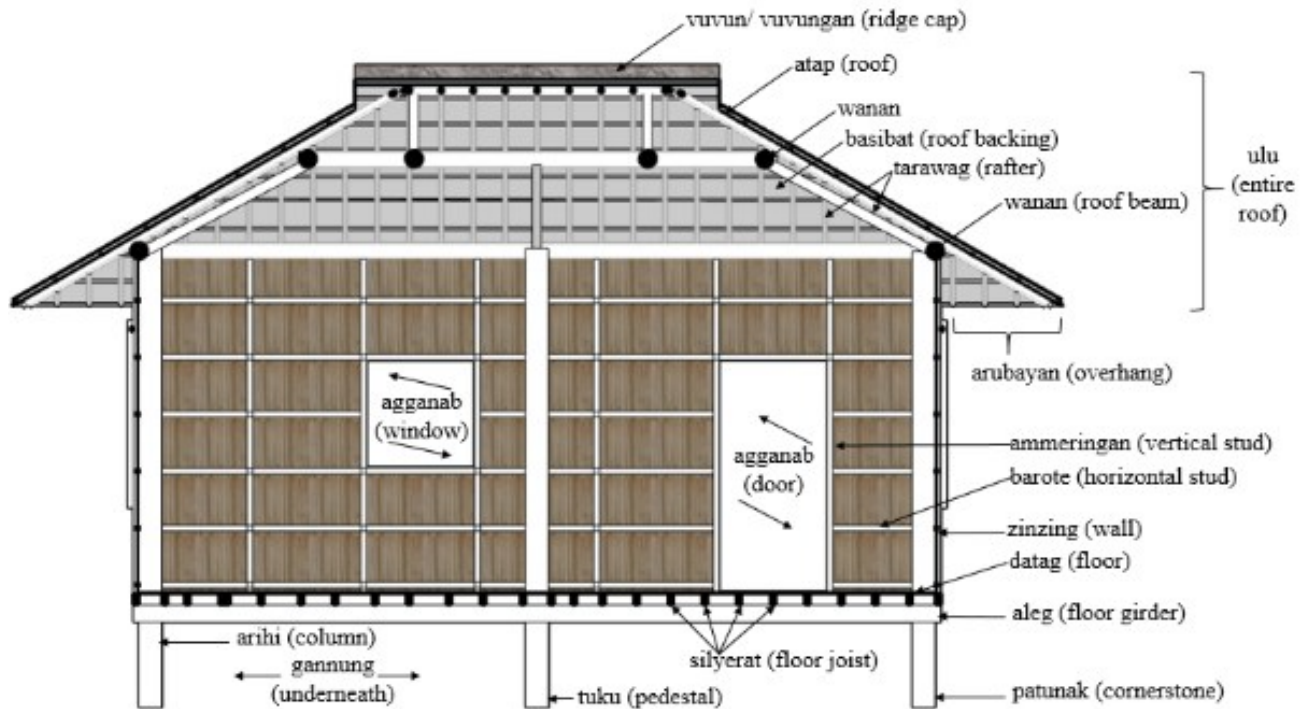
**Figure 5.** A "bridged house" photographed in the 1970s by Israel Cabanilla in Solana (SC).

### 3.1.2 The People as its Main Practitioners

Spanish colonial records of Itawit communities include towns of Tabang (now Santo Niño), Tuao, and Piat – all of which are found along the Chico River (tributary emptying to the Cagayan River) and along the Pangul Valley in the Middle Cagayan (Keesing, 1962). Later, they migrated upstream southwards (Southern Cagayan) to Enrile, Iguig, Peñablanca, Solana, Tuguegarao, as far as Echague, Isabela. In this study, samples of buildings (Table 1) include (1) residential, (2) agricultural, (3) animal housing, and (4) in oral tradition in MC include military structures.

Table 2 includes data from the fieldwork: identified respondents from MC and SC who practice indigenous architecture: shamans (for rituals), carpenters (for construction tradition), building owners (for their houses), the elderly (collective memory), and others like local authors and ethnographers. It also includes ritual process, ID'd structures, architectural membrane description, and data sourcing. All local architectural and non-architectural terms were collected in a wordlist (some with definitions). SC is more accessible, hence having a richer sample than MC, which is politically unsafe, hence limited fieldwork was conducted.





**Figure 6.** Sample Anatomy of an Itawit house.

**Table 2:** Sampled data from Itawit sites, including literature.

| Region           | Barangay (Town)  | Identified ritual steps | Identified structures | Architectural membrane |       |      | Respondents                     | Data source                |
|------------------|------------------|-------------------------|-----------------------|------------------------|-------|------|---------------------------------|----------------------------|
|                  |                  |                         |                       | Wall                   | Floor | Roof |                                 |                            |
| Middle Cagayan   | Concepcion (AM)  | 5                       | Rb                    | Bh                     | Bs    | Bh   | shaman                          | Int, Fw, Ph                |
|                  | Gumarueng (PT)   | N/A                     | Rb                    | NP                     | NP    | GI   | ethnographer                    | Int, Ph                    |
|                  | Balanni (SN)     | N/A                     | Rb, Ah                | Bh                     | Bs    | GI   | local                           | Ph                         |
|                  | Centro (TU)      | N/A                     | Colonial structure    | M                      | N/A   | N/A  | local                           | Int, Fw                    |
| Southern Cagayan | Maddarulug (EN)  | 1                       | Rb                    | Wfb                    | Pw    | GI   | carpenter                       | Int                        |
|                  | Malabbac (IG)    | 1                       | Rb                    | Fb                     | Bs    | Cs   | house owner                     | Int, Fw, Ph                |
|                  | San Vicente (IG) | 3                       | Rb, Ab, Ah            | Wp, Bh, GI             | NP    | GI   | house owner, carpenter, elderly | Int, Fw, Ph                |
|                  | Dodan (PB)       | 2                       | Rb                    | Cb                     | Bs    | GI   | house owner, elderly            | Int                        |
|                  | Cattaran (SL)    | 3                       | Rb, Ab, Ah            | Wfb                    | Wp    | Cs   | shaman, carpenters              | Int, Fw, Ph                |
|                  | Cataggaman (TG)  | 1                       | Rb, Ab, Ah            | NP                     | Wp    | GI   | local author                    | (Andal, 2018)              |
|                  | Linao (TG)       | N/A                     | Rb, Ab, Ah            | Wfb                    | Bw    | Cs   | house owners                    | Int, Fw, Ph                |
|                  | Tanza (TG)       | 2                       | Renovated             | Cm                     | Rc    | GI   | carpenter                       | Int, Ph                    |
| Isabela          | Echague          | 3                       | N/A                   | N/A                    | N/A   | N/A  | N/A                             | (Manzolim & Quilang, 2015) |

\*Abbreviations used in Table 2: Residential building (Rb), Agricultural building (Ab), Animal housing (Ah), Military structure (Ms); Bamboo halves (Bh), Wood plank (Wp); Cogon shingles (Cs), Cement board (Cb), Weaved flattened bamboo (Wfb), Flattened bamboo (Fb), bamboo slats (Bs), Whole bamboo (Bw), Plywood (Pw), Ms (masonry, colonial period); Cm (concrete masonry), Rc (reinforced concrete), GI (galvanized iron sheets); Int (interview), Fw (fieldwork), Ph (photo).

As observed (Table 2), the MC and SC differ in extant ritual processes by shamans (5 steps for MC and a maximum of 3 for SC). Tabao (2025) includes 5 ritual steps in MC as narrated by a shaman: *Arte*, *Patunak*, *Makergo*, *Mattaliguni*, and *Aggunet* while most of the identified ritual steps for SC is the *Patunak*, hence 1 for Maddarulug, Malabbac, Cataggaman; 2 steps (*Arte* and *Patunak*) for Dodan and Tanza; 3 steps (*Arte*, *Patunak*, *Makergo*). Comparing MC and SC, in MC there is more frequent

usage of bamboo halves in MC for the wall and roof, while the wall style for the SC is weaved, flattened bamboo.

However (see Figure 7), there are still similarities in MC and SC practice: modernization of these indigenous houses is inevitable, with samples from an urban area TG (SC) that replaces their roof from cogon shingles with galvanized iron, weaved bamboo into drywall; some structures' original usage was changed from the storage of food or agricultural products into storage for old household items. Another similarity is how building volumes change from bridged (Fig. 7.A.), independent (Fig. 7.B.), and clustered forms (Fig. 7.C.). Their roofs also have different shapes, namely (1) *binangan* (hipped, Fig. 7.D.), (2) *palayag* (shed, Fig. 7.E.), (3) *inangkamalig* (gabled, Fig. 7.F.), and (4) *sinampalayag* (unequal gable, Fig. 7.G.). Building types and structures are also based on the agricultural life of the Itawit. Fig. 7.H. is a typical example of a house in Middle Cagayan, and other structures are for grains (Fig. 7.J.) and chickens (Fig. 7.I. & K.). Floor materials also differ based on the economic capability of the building owner, and may be based on the intrinsic strength of materials. For example, storage buildings have floors of whole bamboo (Fig. 7.L.) rather than slats only (Fig. 7.N.). Residential floors can also be in the form of wood planks (Fig. 7.M.) or directly to the ground (Fig. 7.O.).



Figure 7. Architectural forms of Itawit Architecture.

### Ecological Mediums

Mediums, whether in the role of the shaman or for each offering, are attempts to link themselves with the natural world. As such, animism or their spirituality is significant to the idea of “ethno-sustainability” since it is an expression of (1) their respect for the unseen and (2) their deep understanding and connection with nature and its forces. Furthermore, rituals help protect and conserve



several ecological constituents found in offerings such as the (a) *bannay* (dwarf cardamom), (b) *nammurangngan* (goose grass), (c) *asin* (salt), (d) *baggat* (rice), (e) *kikkid* (kabibe shell), (f) *daha-manuk* (chicken blood), (g) clam shells, (h) pigs, (h) house lizards, and a lot more. This protection of important ingredients in their rituals further nurtures the said species in their respective localities. Their respect for the unseen elements is evident in the ritual *Makergo* (Tabao, 2025) - asking permission from the *Kutu-lusak* before constructing a house, which was delineated in the signs and omens that animals show during the process of their attempts to connect and reconcile themselves with these unseen personifications of elements around them. Even the death of ants or insects, even before the structure is built, is a sign that they value life and that the future structure will harm the local habitat. This ancient practice of identifying sites shows that indigenous knowledge and understanding have been in place with the Itawit culture of constructing buildings. Extinct practices such as human sacrifices as a form of *Tarug* (lit., offering) in Itawit architecture are no longer encouraged, but have been subject to local lore among their community – a lesson that makes building traditions evolve through time. As observed, people, nature, and elemental beings have direct connections with each other, hence the gradual development of ritualistic steps in making sure that buildings are safe, comfortable, and conform to the community's tradition. Furthermore, the modifiers of their architecture (i.e., people, nature, and elemental beings) merit recognition, respect, and preservation of their beliefs, requirements, and wishes as reminders of their holistic relationship with each other. This recognition of their spirituality as an expression of ethno-sustainability, in effect, promotes cultural continuity and development to the new and child-bearing generations. In a wider scope, spirituality can encompass almost all elements of Itawit architecture, hence encouraging them to maintain its vitality as an intrinsic portion of their culture.

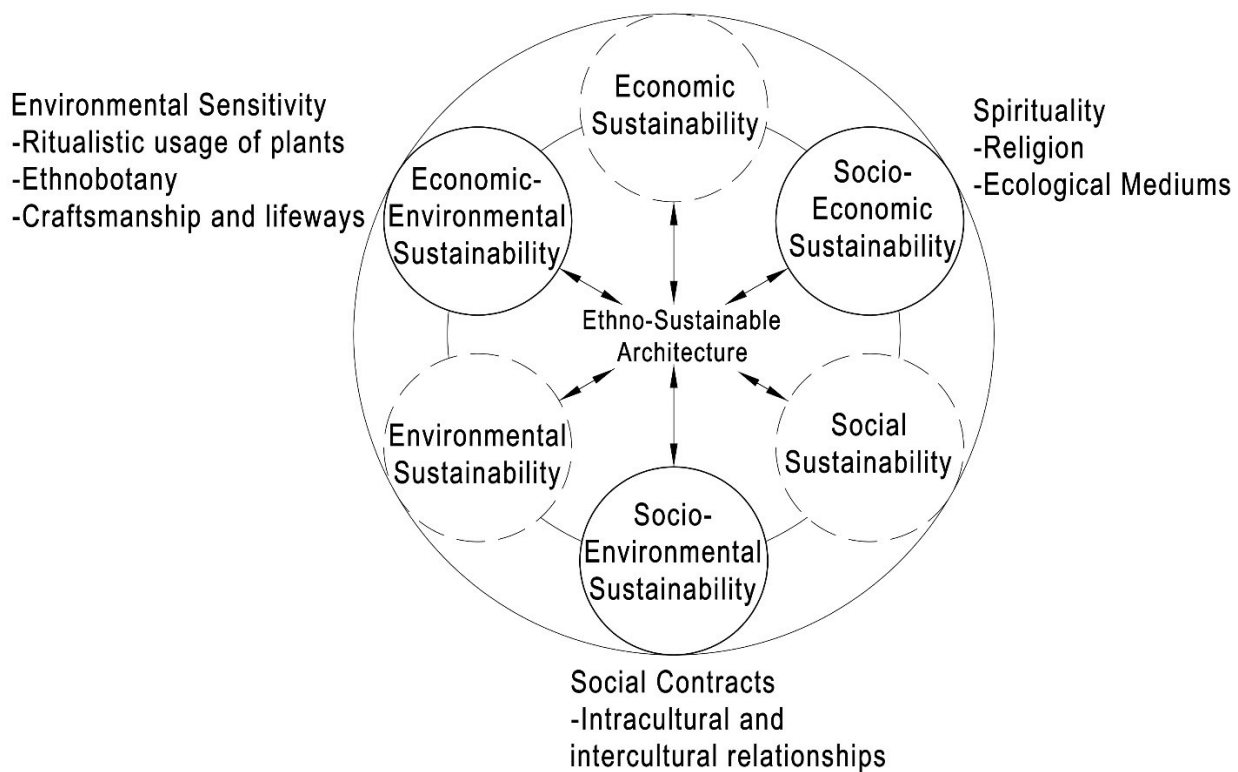
## 4. Discussion

### 4.1 Interpretation of Key Findings

#### 4.1.1 Ethno-Sustainable Architecture of the Itawit

Based on the studies of sustainability and its classic pillars (Soini & Birkeland, 2014; World Commission on Environment and Development, 1987), this study built “ethno-sustainable architecture” with sub-pillars (1) economic-environmental sustainability, (2) socio-economic sustainability, and (3) socio-environmental sustainability as discussed further below.





**Figure 8.** Storylines of "Ethno-sustainability in Architecture."

## 4.2 Ethno-Sustainable Architecture and Spirituality

### 4.2.1 Religion

The Itawit's belief and attachment to the unseen beings influencing their architecture was discovered as distinct (that is, animism) from the modern "Christian" tradition they generally practice. Spirituality (or animism, which is common to Asian building traditions), has shown remarkable similarities that are well-observed with the Itawit of MC and SC, having "systematized" it throughout the pre-construction to the post-construction phase of any Itawit structure, which makes it one of the strongest points as a modifier in their building traditions (Klassen, 2010; Rapoport, 2005). Spirituality as a modifier of ethno-sustainable architecture constitutes several aspects: (1) the role of the shamans in each community, (2) building rituals, (3) omens, as well as (4) taboos, and in this respect, the Itawit's spirituality is focused on their relationship with the unseen elements of nature and with the departed kin or ancestors.

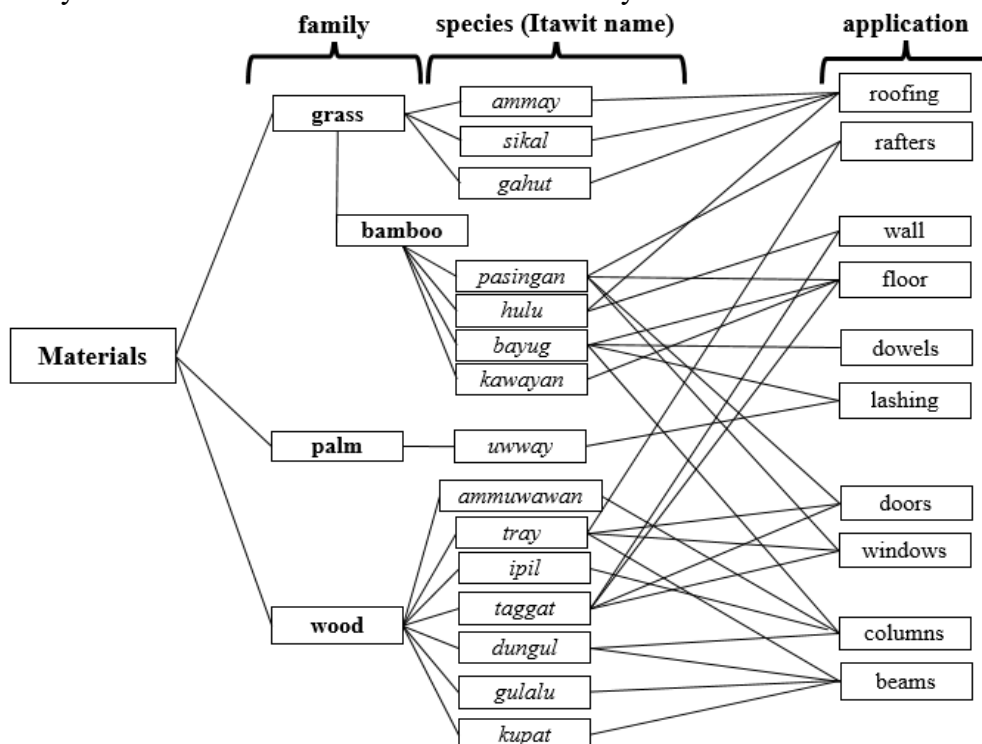
## 4.3 Ethno-Sustainable Architecture and Environmental Sensitivity

### 4.3.1 Ritualistic usage of plants

Environmental sensitivity is an innate aspect and quality that has been recognized in Itawit architecture, hence being ethno-sustainable. As discussed earlier, the attached spiritual implications of building materials, plants, and elements for offerings are well memorized and transferred via oral tradition. Environmental sensitivity is a crucial aspect of the building tradition that plant growth and seasoning of materials are diligently noted to suit their needs individually and as a community. As a notable example, the culling of materials is strictly chosen based on (1) signs as prescribed by the book *Arte*, (2) the need, (3) the quality, and (4) the timing of construction. It is assumed that since ethnic architecture is already an ancient practice, evidence of the materials' presence can be identified in the local language itself – that terminologies can be a tool also in continuing the tradition, as well as the identification of the indigent materials.

### 4.3.2 Ethnobotany

The building materials are chosen based on the existing collective knowledge passed down through generations and are best described in Rocero (1982), see Figure 8. This study identifies and confirms the usage of consistently almost the same wood species: *ammuwan* (*Vitex parviflora* Juss.), *tray* (*Shorea guiso* (Blanco) Blume), *taggat* (*Pterocarpus vidali* Rolfe), *dungul* (*Tarrieta sylvatica* (Vid.) Merr.), *ipil* (*Intsia bijuga* (Colebr.) O. Ktze.), and two unknown wood that was “discovered” used *gulalu* and *kupat*; on the bamboos, the species repeatedly mentioned by the locals are: *pasingan* (*Bambusa spinosa* Roxb.), *hulu* (*Gigantochloa levis* (Blanco) Merr.), *bayug* (*Dendrocalamus merrilliamus* Elm.), and *kawayan* (*Bambusa vulgaris* Schrad.); for the grasses, they use: *gahut* (*Imperata cylindrica* (L.) Beauv.), *sikal* (*Sorghum propinquum* (Kunth.) Hitchc.), and sometimes *ammay* (*Oryza sativa*); and for palm *uwway* (*Calamus* sp) for strings and ties for fastening. The direct connection with the indigent species and their quality and usage in building tradition saves other species from unnecessary use. For instance, quality dictates the wood is chosen as well as the ritualistic and taboo connected with it, eg. materials that are taken from the river (hence, free) cannot be used for the construction of houses because they believe that after the house will be built from “free” materials, it won’t have any rest with visitors. “Free” materials are only reserved for furniture.



**Figure 9.** Indigenous building materials and their application in Itawit structures.

### 4.3.3 Craftsmanship and lifeways

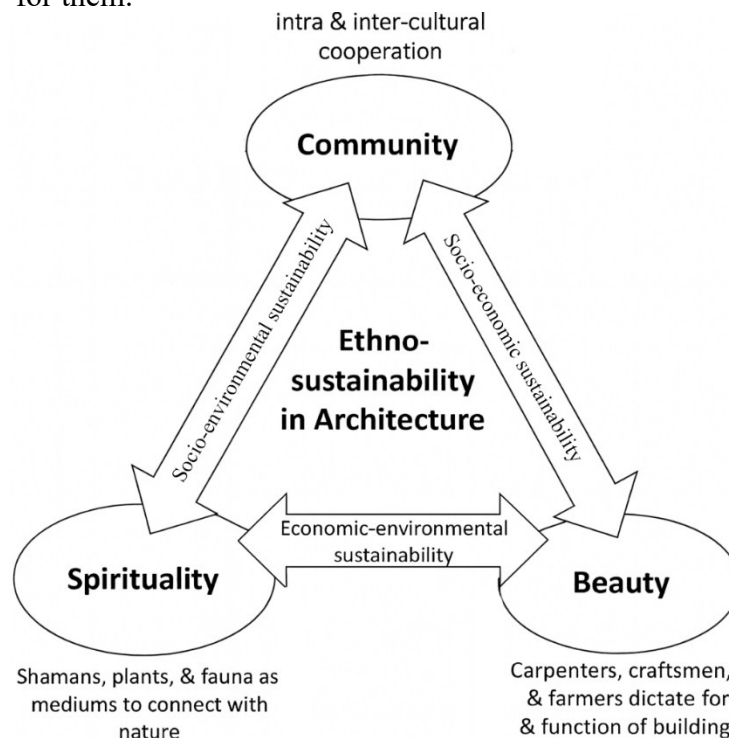
Due to their cultural value, natural materials should be sustainably protected, and their local name should be retained and encouraged to be used. In sourcing construction materials, there are three known distinct terms: (1) megalut (finding plants for ties and fastening), (2) mamanggu (gathering timber), and (3) mamulu (gathering bamboo). Craftsmanship has been observed as the key contributor not only in the way the materials are carefully gathered in situ but also in the specific usage of each species throughout the building components. Sensitivity in this sense results in the maximized use of these environmental assets. Knowing their basic lifeways, i.e., dry agriculture, this study identifies building types (Table 2): (1) dwellings/ residential buildings, (2) agricultural buildings, (3) animal housing, and (4) military structures. All structures found mostly are made of wood, bamboo, and cogon/ elephant grass; they only differ based on their usage. It cannot be completely concluded that all Itawit are poor since their architecture depends on what is available locally and matches their economic status. As

observed, animal houses are easier to build, hence allowing the style to continue since it is common for the Itawit to take care of poultry and animals for their farms and subsequently for sustenance.

#### 4.4 Ethno-Sustainable Architecture and the Social Contracts

##### 4.4.1 Intracultural and Intercultural relationships

Realizing the model of inter-relationships between ethnic groups transcends race and prejudices in their community, especially in the case of trade. For instance, the unwritten rules – that is, social contracts, are still present in all Itawit communities in Cagayan, as documented in this study, such as their rituals (whether for blessing construction or the building itself), gathering of materials, and construction methodology. Social contracts are expressed via a local agreement between families, kin, neighbors, even simply a fellow Itawit, or in other cases with the Atta along the Sierra Madre mountain range. These early partnerships and mutual understanding in collecting construction materials show the importance of sustaining communities and sharing (through the trade of goods or in the form of services) the environment's resources, which are among the notable results of this study. These mutual understandings have been prevalent in their communities during their construction and other important activities (such as festivities) in their area. The most notable in this regard is the term *ivvet*, where the community or the building owner's relatives voluntarily build. This also makes an “unwritten social [community] contract” that a family should have a representative in an *ivvet* so that when the same family will need to construct their house, people will also volunteer and this condition of the owner to be automatically obliged to support the builders by preparing their meals and snacks. This is applicable not only in construction but also for funerals, weddings, festivities, and other important events in their lives. This “social contract” of the Itawit shows a profound way in their expression of ethno-sustainability, that their tradition endures by utilizing the resources (labor workforce) efficiently without introducing conflicts on the way – they understand each other's needs and have to act on it, a sort of “Golden Rule” for them.



**Figure 10.** Ethno-sustainable Architecture's structure and storylines.

Figure 10 presents “Ethno-sustainability in Architecture” and the emerging “Sub-pillars” as (1) Economic-environmental Sustainability, (2) Socio-economic Sustainability, and (3) Socio-environmental Sustainability. Under each sub-pillar are the theories built or the “storylines” (Soini, et al., 2015; Rapoport, 2005).



## 5. Conclusion

This study set out to investigate the ethno-sustainability of Itawit architecture in Cagayan, Northern Philippines, and to highlight how indigenous construction practices reflect cultural heritage, ecological sensitivity, and community resilience. Using a grounded theory approach, the research documented rituals, material traditions, and social contracts that define Itawit building systems. The findings confirm that despite modernisation pressures, vernacular knowledge continues to survive through oral transmission, collective labour practices, and the ecological logic embedded in construction methods. The results contribute to a broader understanding of sustainable architecture by framing “ethno-sustainability” as an integrative concept where spirituality, environmental stewardship, and social cohesion intersect. Itawit architectural traditions demonstrate that sustainable design is not solely a technical matter but also a cultural practice rooted in belief systems, rituals, and local lifeways. By documenting these practices, the study enriches Philippine architectural literature and provides a model for other indigenous contexts where heritage and sustainability must be harmonised.

The implications of this research are significant for policy, planning, and conservation. Integrating Itawit traditions into contemporary development frameworks can support culturally sensitive and environmentally responsible strategies in both rural and urban settings. Policymakers, urban planners, and conservationists can draw on the lessons of ethno-sustainability to promote inclusive approaches that recognise the value of local materials, collective labour, and ecological balance. This makes Itawit architecture not only a subject of heritage preservation but also a living model of resilience applicable in contemporary sustainability debates. Nevertheless, the study acknowledges its limitations, particularly in terms of geographic scope and representativeness, given that only certain Middle and Southern Cagayan sites were accessible. Further research is recommended to extend documentation across other communities, deepen analysis of ethnobotanical practices, and explore policy integration more explicitly. Overall, this investigation demonstrates that indigenous architectural traditions can meaningfully inform sustainable development, and that the Itawit experience offers enduring insights into the coexistence of cultural continuity, ecological care, and community resilience.

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## Conflicts of Interest

The authors declare no conflict of interest.

## Data availability statement

The original contributions presented in this study are included in the article and supplementary material. Further inquiries can be directed to the corresponding author(s).

## Institutional Review Board Statement

Informed consent was obtained from all participants. All ethical considerations, including confidentiality and the right to withdraw without penalty, were appropriately addressed.

**CRedit author statement**

Conceptualisation: M.T.T. & J.P.T.; Data curation: M.T.T.; Formal analysis, Investigation, and Methodology: M.T.T. & J.P.T.; Project administration, Resources, Software, and Supervision: M.T.T. & J.P.T.; Validation and Visualisation: M.T.T.; Writing – original draft: M.T.T.; Writing – review & editing: M.T.T. & J.P.T. All authors have reviewed and approved the final version of the manuscript.

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